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ABSTRACT

Four major needs for innovative application of measurement in higher education are identified. They are to: (1) provide assistance to students in selecting appropriate institutions for postsecondary education and training and to institutional staffs in more effective counseling techniques; (2) cope with instructional problems which get greater as student characteristics become more diverse; (3) establish alternative methods for granting credentials and degrees; and (4) establish measures to assess the improvement of out society and to provide equal opportunity for individuals. (Author/RC)

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NCME measurement in education

A SERIES OF SPECIAL REPORTS OF THE NATIONAL COUNCIL ON MEASUREMENT IN EDUCATION

Winter 1974

Fred F. Harcleroad

ABOUT THIS REPORT

Over the past ten to fifteen years our society has been changing at a more rapid pace than at perhaps any other time in history. With these changes we have also seen the need for modifications in the uses and techniques of measurement in society.

This report identifies four major needs for innovative application of measurement in higher education. They are to:

1. Provide assistance to students in selecting appropriate institutions for postsecondary education and training and to institutional staffs in more effective counseling techniques.
2. Cope with instructional problems which get greater as student characteristics become more diverse.
3. Establish alternative methods for granting credentials and degrees.
4. Establish measures to assess the improvement of our society and to provide equal opportunity for individuals.

Fred F. Harcleroad has devoted most of his professional life to higher education and has been especially interested in providing better opportunity in postsecondary education for all youth. He is currently President of the American College Testing Program. Before assuming that position in 1967 he held a variety of academic teaching and administrative posts in institutions of higher learning including the University of Iowa, California State Universities at Hayward, San Jose, and San Diego and Stanford University. He writes extensively and has been active in numerous professional organizations and is currently President-Elect of the Association of Professors of Higher Education.

CJF

The Tangled Web

Fred F. Harcleroad

Most of us gathered here today will agree that the applications of measurement are practically infinite. But I wonder what *you* would *consider* the ultimate in measurement? Now that each of you have settled on your particular answer, please consider this one—a quotation from the Smithsonian Magazine of February 1973 on medical measurement, and I quote exactly:

> *"By weighing terminal patients on an extremely sensitive scale and noting a small weight loss at the moment of death, a Swedish doctor claims to uncover quantitative measure not to say proof of existence of the human soul. It actually weighs 21 grams!!"*

Certainly most of us will stop far short of this ultimate question but we must and will, push further to help our society to improve. Let me pose a second question—how much is measurement improving society? How much are measurement specialists currently enriching today's society? The tangled web in which we are currently enmeshed places a great burden on measurement specialists and educational evaluators, as much as any other professional group. The "tangle" needs structure and organization based on data of the types which measurement persons can supply.

Why is the web of our social structure more tangled today than in times past? Possibly, and hopefully, it is because we are coming closer to a truly just society—one of equal opportunity for a rapidly increasing proportion of our total population. When hope is in vain, societies are more quiescent. When change seems possible, it comes too slowly for those who have hope, and tensions rise.

Robert Ardrey, the controversial and truly irritating anthropologist, who wrote *African Genesis* a few years ago, and *The Territorial Imperative* ten years later, has recently rewritten *The Social Contract.* He emphasizes at the beginning of the book that—and I quote . . . "A society is a group of *unequal beings* organized *to meet*

common needs." While a society of equals, whether baboons or jackdaws, lions or men is a natural impossibility, a just society is a realizable goal. He goes on to describe a just society as . . . "one in which sufficient order protects members, whatever their diverse endowments, and sufficient disorder provides individuals with full opportunity to develop their genetic endowments—whatever they may be." The balance of disorder and order, varying in rigor according to environmental hazard, he thinks of as The Social Contract. At the end of the book, 360 pages later, he states:

> *". . . We shall make compromises. Society will recognize as the social contract dictates, that the individual is the one and only source of human fulfillment. As government is the servant of the people, the organization will recognize itself as the servant of the individual, without whose genius organization would be a fishnet in intercellular space. We shall make elbow room, whatever the price, for individuality. But the individual will make compromises too, for (individuals) must renounce the mob and . . . grant that men are created unequal."*

Thus, schools and measuring persons must serve the needs of individuals.

Now—most of my professional life as a specialist in higher education has been devoted to providing better opportunity in postsecondary education for those who are, shall we say, more unequal. Thus, it is a distinct pleasure to discuss with you specialists of measurement and evaluation some key areas for your continuing attention and creative efforts. In discussing future applications of measurement in education, I want to pinpoint four major areas which beg for innovative application of measurement and measurement techniques. These are:

(a) applications of measurement to assist students in making informed judgments about the institutions of postsecondary education and training which they will attend, in addition to the applications of measurement to help institutional staffs make judgments and provide counsel and help for the students who *do* attend,

(b) applications of measurement to overcome instructional problems that result from the greatly increased diversity of students' characteristics within given institutions,

(c) applications of measurement techniques useful in establishing alternative methods of credentialing and earning degrees in a credential-hungry society, and

(d) applications of measurement techniques to establish meaningful "social indicators," measures of improvement of our society and provision for equal opportunity for each person.

Each of these four areas could demand the next hour for adequate coverage—so my remarks will provide broad brush strokes, not the complete detail for which one could wish. First, with the increasing diversity in students attending postsecondary education and the increasing diversity of types of institutions there is a greater need for information, and thus measurement, than ever before. One of the significant trends in higher education is the ever-increasing percentage of high school graduates (and even non-graduates) who seek some form of postsecondary education. In 1955, 61% of the population of 18-year olds had graduated from high school while only 30% of these 18-year olds were enrolled in postsecondary higher education. In 1970, 76% of the 18-year olds were graduating from high school and some 47% went on to postsecondary higher education. By 1980 it is anticipated that as many as 83% of the 18-year olds will have graduated from high school and fully 60% will enroll in postsecondary higher education, thus in 25 years doubling the percentage attending.

". . . there is a growing need for a wider spectrum of data about students beyond that shown by tests."

The vastly expanded student population referred to previously does not include students who turn to the nation's seven to ten thousand private profit-making proprietary institutions giving postsecondary education training. Those words chosen advisedly, "private, profit-making proprietary institutions," are the most recent type of private higher education—and increasingly successful at the present time. Recent estimates indicate that in 1972 at least one million students were enrolled in this type of private postsecondary education or 10% of all students enrolled in postsecondary education.

This expanded student population is much more diverse in interests, abilities, values, goals, and almost every other factor which we have normally considered in referring to our students. In making predictions about future student populations in the book *Campus 1980,* Nevitt Sanford put it this way:

> *"There will be an expanded and expanding universe of students. More different types of students, greater range of variation on all of the factors we ordinarily used to characterize the students . . . "*

These changes affect directions in measurement in four very different ways. First, there is a need for much more information for prospective students about the postsecondary institutions themselves. Self-selection of institutions by students is a major part of the answer to some of our current problems. Since most students attend postsecondary institutions close to home, state handbooks are far more helpful for 75 to 90% of the students than national handbooks. State scholarship programs and high out-of-state tuition are contributing factors which keep students within their state boundaries. Such state handbooks need to be updated yearly and provide predictive-type data by institution and by field of study. For example, the Regents of the State of Oklahoma have published a highly successful student handbook since 1962. Colorado has had one since 1968, and several other states have varying versions of these handbooks.

Second, there is a growing need for a wider spectrum of data about students beyond that shown by tests. Self-report data has great values. Theda Hagenau, a couple of years ago, told me the value of one single self-report question in selecting personnel who were needed for DEW-line duty during World War II. They were having many problems in selecting persons who would be successful in this very difficult type of work up in Northern Canada and Alaska. Finally, they asked the question: Do you like cold weather? It was a very simple question, with a very straightforward answer. Those who were successful at the DEW-line liked cold weather.

Similarly, ACT has offered the Student Profile Section since 1964-65 as a way for students to tell institutions more about themselves. Demographic and personal measurement data will be one of the major avenues of additional measurement activity nationally, statewide, and in institutions in years to come.

Third, we need more structural data (in the sociological sense) about the secondary schools and their effects on their students—plus more, similar structural data (once again in the sociological sense) about postsecondary institutions and their effects on comparable or the same students. A number of topics on this year's NCME program are related to these points. However, greater diversity—both in students and in institutions—plus additional structural data will provide many variables to be analyzed and related. This is a difficult statistical question. Undoubtedly, they will require new statistical techniques. Bayesian methods may be of value as this expansion of comparative and predictive data takes place. It may well be the most valuable one on the current scene to try to make sense out of the enormous amount of varying data needed to deal with increasingly diversified programs and environments in secondary schools, the increasing diversity of students attending some form of post-secondary education, and finally, the enormously increasing diversity of institutions beyond the high school to whom these students are going.

Fourth, all of this data needs to be presented and used in ways that are fair to each individual student. The treatment of bias in data is going to be an absolutely critical one, and is one of the most important problems now and for the coming decades. Any indices that are developed from group data for institutional use must represent a fair evaluation for each student. Nancy Cole has recently analyzed six models of bias and compared four of them in detail—(1) a regression model, (2) an equivalent risk model, (3) a constant ratio model, and (4) the conditional probability model. These are described in Chapter 7 of the 1973 edition of the *ACT Technical Report* which has been released recently. The four models have been categorized in terms of their analysis for (1) racial-ethnic student groups, (2) sex differences, (3) socio-economic status, and (4) age. Since each of the groups are affected and treated in different ways, depending upon the model which is selected, her clear analysis may help this socially sensitive area. Certainly, nothing could be worse for students than a moratorium on measurement and information which is designed to help them pick institutions where they can succeed. It is unfair and unwise to withhold this kind of information from students.

In meeting the changing needs for *measurement in instructional areas*, the field is broadened considerably and I can present only a few ideas. Consider these two new developments—far apart geographically and in most other ways. Recently in January 1973, the Massachusetts Institute of Technology offered eight courses in the following subjects: (1) How to Pedal a Unicycle (2) How to Blow Soap Bubbles (3) How to Produce Homemade Wine or Beer (4) A Detailed Analysis of Burial Grounds With an Emphasis on History (5) A Course in Wine-Tasting (6) seminar on Why Mirrors Reverse Right and Left But Not Up and Down (7) a course on the Erotic Phenomenology of Mozart's Opera "Don Giovanni" and (8) The Use of a Helicopter Rotor Blade as a Parachute. Offered during the semester break, these courses can be means of making up incomplete grades, or gaining a few more credits. Does the list of courses in your college catalog have this amount of diversity? ..

Across the continent in Portland, Oregon, they have a five-year old high school named Vocational Village. A student's best credentials to enter this unique high school are described as flunkout slips from other high schools, a criminal record, a history of drug abuse or rock-bottom test scores. Physical and emotional handicaps are no bar to admission. The school is a secondary school in the Portland public school system and its name actually is "Vocational Village." It is quietly proving a theory to which other schools pay mostly lip service, and based on the idea that—"Nobody wants to stay a failure forever." There are no grades. To graduate a student needs 19 credits, as in any high school. The student gets them by earning "job sheets, certificates," which state the student has proven an ability to do a particular job, from assembling a small

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Measurement in Education is a series of special reports published four times a year in October, January, March, and May by the National Council on Measurement in Education. These reports are concerned with the practical implications of measurement and related research and their application to educational problems of individuals, institutions, and systems. The emphasis is upon uses of measurement rather than technical or theoretical issues. Subscription rate: $2.00 per year; single copies 35¢ each in quantities of 25 or more, or 50¢ for a single issue.

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engine to using pronouns properly. It takes ninety job sheets to make a credit. 1,710 job sheets in a variety of subjects is required to win a diploma. Students say that working at their own pace is what makes Vocational Village tolerable where their former high schools were not. One of their students is quoted as saying: "If you miss two days somewhere else, everybody goes ahead without you, and if you flunk a test they toss your paper in the trash can and move on to something else. Here, you go back over it until you get it."

These two educational institutions are about as different as I could find to illustrate the changes which are taking place in accredited secondary and higher education institutions. They also illustrate graphically the challenge to evaluation and measurement, to determine what is being measured, why, and how to recognize the people who have completed these educational programs.

However, there are many other diverse, hard-to-measure innovations in the area of vocation, community service, credit by examination and college credit for work experience. The College of New Rochelle of New York recently set up its DC 37 campus for the New York District Council 37 of the American Federation of State, County, and Municipal Employees of the AFL-CIO. This is the first fully accredited institution set up solely for union members. They have very unusual ways to earn and record credits at DC 37 Campus. First, consider their life experience workshops. Based on the notion that adults have already learned a great deal just by living, the workshops provide a setting where they can reflect on and share their own personal and career experiences. Students may also earn life experience credit by preparing a portfolio showing what they have learned from career, community, or family experience. The porttolios are being assembled into a library which will be a learning resource for the college. Also, contracts for independent study are being established as another means.

". . . many diverse approaches to instruction challenge measurement specialists more than any other factor in higher or postsecondary education."

Approved student portfolios are evidence which is accepted for a degree now at many institutions, such as Evergreen State College in Washington, Manhattanville College in New York, and it is partially true at Minnesota Metropolitan State College, an upper division institution in Minneapolis.

The changes taking place in instruction today throughout the United States, that which now is considered legitimate in instructional effort in all types of postsecondary education, is just a beginning. I have illustrated some extremes but there are all types of things in between. These many diverse approaches to instruction challenge measurement specialists more than any other factor in higher or postsecondary education. There is only a little in your conference program on these topics. These few illustrations, plus many that are giving attention to modularized instructional units and their development, merit your best efforts in developing adequate measures.

A third major development of concern to educational measurement specialists is the rapid move to establish alternative methods of credentialing and earning degrees. Some of this is implicit in the previous materials on instruction. It appears that the importance of credentialing will increase rather than decrease in the foreseeable future. Dozens of new degree programs and accreditation associations have

appeared in the allied health professions alone. These developments protect society, you and I, when we have to go to the hospital, and guarantee that only an appropriate properly-trained person will be doing these activities when our life is in their hands. Given the increasing importance of the degree or credential in our society, it seems only logical that the barriers that now exist in getting the credential will be subject to criticism and modification.

". . . measurement can help reduce some artificial barriers to the degree and credential."

In recent years various innovations have been introduced in an attempt to modify institutional structure and make it more convenient to obtain credentials and degrees. Examples are the three-year bachelor's degree, course credit for out-of-class experiences, and expanding role for continuing education, relating industrial and military training to college work and giving college credit on the basis of credit by examination.

Measurement can help reduce some artificial barriers to the degree and credential, and help the institutions which are making efforts in this direction. Measurement focuses on educational outcomes; and as we show these outcomes are career-related and hence performance-related, we help colleges realize careers are where their students go after college. A prime example of innovation in this area is the Associate in Arts degree program of the Regents of the University of the State of New York, comparable in some ways to a super State Department of Education. They have awarded close to 200 Associate in Arts degrees within the past six months through their external degree program. Over 80% of the students are employed full time and 50% have never attended college. Over 10% of the students earned their degree solely by proficiency examinations. Certainly, this has implications for people interested in measurement!! In addition, hundreds of institutions are using the College Proficiency Examination Program, of the University of the State of New York, the College Level Examination Program of the College Entrance Examination Board and the four tests in the ACT National Assessment Program. In a recent survey of our 2,100 participating institutions, we found that several hundred of them give credit to students with appropriate high ranking on our examinations, some as much as 22 semester units. Of course, a number of institutions give as much as 30 semester units, an entire freshman year, based on the College Level Examination Program. Of course, the University of the State of New York earned a full 60 units of credit and an AA degree on the basis of the

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examination. Obviously, this is not the wave of the future, it is here!! And it is important for measurement specialists like yourselves to be aware of it and work with it.

Assessment can be employed further to determine performance competency; and some efforts along this line for credentialing teachers in vocational-technical subjects, for example, has already been under way at some institutions such as Rutgers University. Today, credentials are needed not just for self-confidence but to obtain certain jobs. Individuals may not be better prepared for a job because they have a credential—but they may not be able to work without it. Both two- and four-year colleges can make the degree and credential they offer more meaningful by relating some coursework more explicitly to requirements of careers, in which case more people with a degree would possess initial basic competencies for careers in question. This means colleges will have to know what competencies various careers require, what competencies they do not require, and how needed competencies can be developed and demonstrated. Here, assessment (measurement) becomes critical. This is where measurement can make a valuable contribution.

". . . some new set of indicators must be established which will more meaningfully reflect the state of our society."

Finally, I want to stress a needed problem-child of the future, the need for "social indicators." (In doing this I have left out measures of teacher accountability, measurement institutional environments, state testing programs, debates about mastery and criterion or norm based testing, and all of those things that are so important in a measurement conference of this sort. But you will be dealing with those in other places.) I want to call your attention to social indicators. Let me suggest that you worry in the near future about this subject.

Today in the United States, we have a Council of Economic Advisors, an annual Economic Report, and a system of National Income and Product Accounts. We have an index of a variety of factors which are called the Consumer Price Index and another called the Unemployment Rate. These are just a few in the economic area. However, we do *not* have a Council of Social Advisors, nor do we have a set of National Social Accounts. And they are needed. Currently, we are learning that those things that are most easily measured are not always the most meaningful indicators of a society's success in measuring the quality of life. For example, disposable personal income, though it is easily measured, is not a very reliable measure of poverty. Many are surprised find unrest and discontent growing at a time when national income is rising so rapidly. It seems paradoxical that the economic indicators generally register continued progress, rising income, and lower unemployment—while the streets and the newspapers are full of evidence of growing discontent—burning and looting, strife on the campus, crime in the streets, alienation and defiance among the young. It seems obvious that some new set of indicators must be established which will more meaningfully reflect the state of our society, than those which are purely economic.

In 1966-69 Wilbur Cohen, then Secretary of HEW, tried to start a yearly social report and chart our social progress. The report was published in 1969, entitled *Toward A Social Report*. They found that, at that stage in our measurement capability, they actually could not produce a social report. Thus they had to put the word "toward" in the title. This small but very important blue book is available inexpensively, from the Federal government, and provides a summary of critical future thinking in this area. It attempts to deal with several areas of American life where yard sticks or measures might be developed, such as health and illness; social mobility; our physical environment; income and poverty; learning, science and art; and participation and alienation. Notice that the term education was not included as a separate item on this list. Learning is considered important; education per se was left out.

Some of the sections of this report have important implications for groups interested in the future of measurement. If social indicators are to be used, methods must be found whereby social conditions can be meaningfully measured. Only through measurement can social indicators be of value in solving the nation's social problems. And measurement is the key to answering questions such as these from that report, those which appear to be the most important ones for those of us in measurement in education: (1) In regard to social mobility in our country—how much opportunity is there? What effect does education actually have? What about the various types of educational institutions and the effect? (2) In terms of income and poverty—are we better off? and (3) In the areas of learning, science and art—how much are they enriching society? *Toward A Social Report* also suggested a few educational measures related to opportunity for work, as related to race, and as related to overall learning.

Unfortunately, although many statistics are available in the *HEW Digest of Educational Statistics,* there is almost no direct evidence of the amount students have learned. Perhaps the National Assessment Program will help. Certainly, that was one of the purposes in funding it. It could become a national index of what people are learning. Our state and national testing program should be working toward an appropriate

aggregation of available and improved data. Bertram Gross, a leader in the field of social indicator theory, does not include education as an end in itself in his listing! Furthermore, for years he has included as critical parts of education such items as on-the-job training, correspondence courses, military education, adult education, and proprietary private institutions. We are just beginning to start figuring on these as part of the educational totality in the United States. Another proponent of social indicator theory, Albert Biderman, has stressed that too few educational measurement projects provide "before and after" measures which "test a specific hypothesis derived from a highly explicit theory of a dynamic process," making appropriate inferences difficult. Without such studies, indications of social growth and improvements in the quality of life cannot be stated.

An educational system which promotes economic and social mobility is one of the key factors that can weld a society together. An open and effective educational system must overcome discriminative barriers toward upward mobility which are based on caste, race, sex, religion, or physical differences. These concerns are important to the educational field's experts in measurement. I challenge you to think in the context of a future social report as you consider the special studies and techniques which engross you at this conference and when you return to your homes. *Toward A Social Report* includes this provocative sentence on page 70, "The greatest challenge to American education today is to find ways of helping low income children learn the basic intellectual skills so they can be more successful in school and compete more successfully for jobs and rewarding positions in the community when they become adults." Those of us in elementary, secondary, and higher education should think very carefully about that sentence. I would add only this: As educators, we need genuinely to work to bring justice in our society—through fairness to all students. Give them the information they need about themselves, about educational institutions, and about work in which they can be successful. Measurements are essential in order to be fair and just and to provide equal opportunity for unequal people.

An Invited Address Presented to the National Council on Measurement in Education on February 26, 1973.